SMART-1: Travel maps of the lunar north pole

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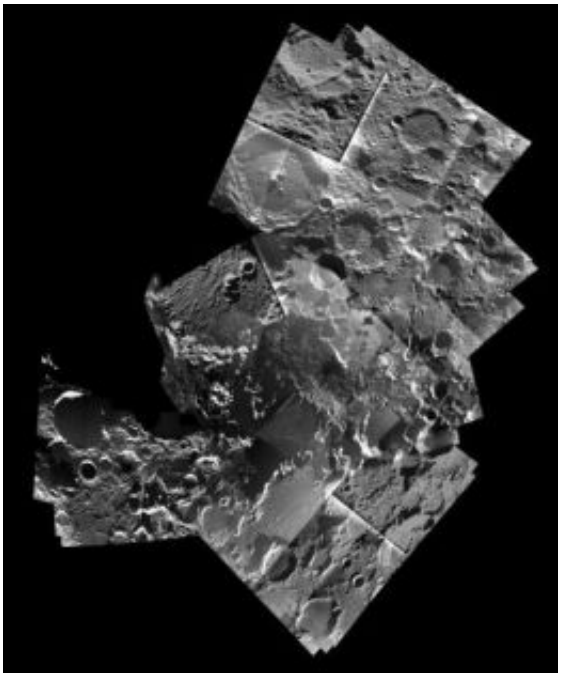

This mosaic of the lunar north pole was obtained with images taken by the Advanced Moon Imaging Experiment on board ESA's SMART-1. The pictures were taken between May 2005 and February 2006, during different phases of the mission. The mosaic, composed of about 30 images, covers an area of about 800 by 600 km. The lunar near-side facing Earth is at the bottom of the map, while the far-side is at the top. When obtaining the images, SMART-1 was flying over the north pole at a distance of about 3000 km, allowing large-field (about 300 km across) and medium-resolution views (300 m/pixel). Each individual image includes areas imaged with colour filters and a more exposed area. The differences have been corrected accordingly to obtain this mosaic. Credit: ESA/Space-X

A new map obtained with SMART-1 data shows the geography and illumination of the lunar north pole. Such maps will be of great use for future lunar explorers.

The lunar poles are very interesting for future science and exploration of the Moon mainly because of their exposure to sunlight. They display areas of quasi-eternal light, have a stable thermal environment and are close to dark areas that could host water ice – potential future lunar base sites.

The SMART-1 north pole map, covering an area of about 800 by 600 km, shows geographical locations of some craters of interest. Peary is a large impact crater closest to the north pole. At this latitude the interior of the crater receives little sunlight, but SMART-1 was able to observe it during phases when the crater floor was sufficiently illuminated for imaging.

A previous lunar mission, the U.S. Clementine, observed the Peary crater during the north summer, and identified some areas particularly illuminated by the sun in that season. With its Advanced Moon Imaging Experiment (AMIE) micro-camera, SMART-1 has complemented this data set by identifying the areas that are also well-illuminated during northern winter.

“Solar illumination makes these areas ideal for robotic outposts or lunar bases making use of solar power,” added Foing.

Hermite is another lunar impact crater located along the northern lunar limb, close to the north pole of the Moon. Looking from Earth, it is viewed nearly from the side, illuminated by oblique sunlight.

Crater Plaskett is located on the northern far-side of the Moon, about 200 km from the north pole. It receives sunlight at a low angle. Because

of the isolation of this crater and its location near the lunar limb, it has been suggested as a possible additional site of a future lunar base that could be used to simulate isolated conditions during a manned mission to Mars.

“From the crater rim, rovers could be sent out to explore nearby craters which are permanently in shadow and may contain water ice. If the layers of ice come from the volatiles deposited by comets and water-rich asteroids, we could better understand how, and how much, water and organic material was delivered to Earth over its history,” said Foing.

Source: European Space Agency